

B.Tech. IV Semester (Main) Examination, June/July - 2015

Computer Science and Engineering

4CS5A Fundamental of Communication

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 26

**Instructions to Candidates:**

Attempt any **five** questions, selecting **one** question from **each** unit. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)

**Unit - I**

1. (a) What are modulation & its need? Explain the working principle of envelope detector for demodulation of AM wave using suitable diagrams. (8)
- (b) The Antenna current of an AM Broadcast transmitter, modulated to a depth of 40% by an audio sine wave is 11 ampere. It is Increase to 12 amp. As a result of sinusoidal modulation by another audio sine wave. What is the modulation index due to second wave. (8)

**OR**

1. (a) Explain the role of pre-emphasis and de-emphasis in FM system. (8)
- (b) Find the modulation index, modulating frequency, carrier frequency and maximum deviation of FM wave represented by the voltage equation  $e=12\sin(6 \times 10^8 t + 5 \sin 1250t)$ . What power will be the FM dissipate in a 10 ohm resistor. (8)

**Unit - II**

2. (a) State the Sampling theorem for band limited signal. What is aliasing and how it is reduced? (8)

(b) Determine the nyquist sampling rate and nyquist sampling interval for the following signals:-

(i)  $1/2 \pi \text{Cos}(4000 \pi t) \text{Cos}(1000 \pi t)$

(ii)  $\text{SinC}(100 \pi t) + 3 \text{SinC}^2(60 \pi t)$  (8)

OR

2. (a) Describe modulation & Demodulation method for PAM. (8)

(b) Explain natural and flat top sampling. (8)

Unit - III

3. a) What is companding? Explain a  $\mu$ -law and A-law for non-uniform quantization. (8)

b) Consider a sinusoidal signal  $m(t) = A \cos W_m t$  applied to a delta modulator with step size  $\Delta$ . Show that the slope overload distortion will occur if

$$A > \frac{\Delta}{W_m T_s} \quad (8)$$

OR

3. a) Draw the block diagram of PCM system and discuss each block in detail. (8)

b) Explain T-1 carrier system (digital) using suitable diagram. Also calculate bitrate & bandwidth of it. [rtuonline.com](http://rtuonline.com) (8)

Unit-IV

4. (a) The bit sequence 1110110011 is to be transmitted using different coding techniques (a) unipolar RZ and NRZ (b) polar RZ and NRZ.

Draw all the wave form for given bit sequence. (8)

(b) What is Inter symbol interference ? Explain Nyquist criteria for zero ISI. (8)

OR

4. a) Explain the generation, coherent and non-coherent detection of Binary FSK signals using suitable diagrams. (8)

- b) Explain the generation and detection of QPSK signals using suitable diagrams (8)

**Unit -V**

5. (a) What is PN sequence and How it is generated ? What is maximum length sequence ? (8)
- (b) What is Direct sequence spread spectrum modulation. (8)

**OR**

5. (a) What is frequency hop. Spread spectrum ? How does FHSS provide secured communication ? (8)
- (b) Define processing gain in a CDMA system. How is the capacity calculated for a CDMA system. (8)